The Economy and Presidential Approval

David L. Kleykamp
Associate Professor of Economics
Tamkang University

The Economy and Presidential Approval

Abstract

Conventional wisdom has it that the performance of the economy is extremely important in determining the approval ratings of a president. A poorly performing economy is thought to undermine the re-election prospects of any presidential incumbent. Our paper takes issue with this conventional wisdom. It finds that while both inflation and unemployment are statistically significant variables in determining presidential approval, they are not economically or practically significant. Indeed, all of the common macroeconomic variables discussed so often in the news are of little or no importance in determining a president's job approval rating. The paper presents a novel way of modeling the influence of inflation and unemployment on job approval by introducing what is termed "pathological interaction terms". This is where the exogenous variables interact with lagged (exponentiated) dependent variables in a multivariate regression model. A monte carlo study is done to ascertain the critical values necessary to test significance on the regression coefficients. Our data is very clear in showing that unusual events such as accession to office, terrorism, wars, and scandals are far more important in changing a president's approval ratings than economic performance.

Key Words: presidential approval, inflation, unemployment, multivariate regression, party affiliation, autoregression, pathological interaction, monte carlo experiment, dummy variable, regression stability

The Economy and Presidential Approval

I. Introduction:

Conventional wisdom says that the outcomes of surveys on job approval ratings for sitting American presidents are highly dependent on the current state of the US economy.[1] This abstract notion crystallized in 1990 and formed a political mantra for the Clinton election team during the run-up to the Clinton-Bush presidential race. It was encapsulated in the deprecating admonition…"*It's the economy – stupid!* ". Much the same casual empiricism lies behind such well-worn phrases as "*Americans vote their pocketbooks*" and "*as goes Wall Street, so goes Main Street*". Yet, there are a number of reasons to doubt the strength of the relation between the economy and presidential popularity. Even during periods when the relation seems to hold, the ability of general economic performance to determine popularity is astonishingly limited. The economy simply doesn't explain much.[2]

---

[1] There is a vast literature dealing with presidential popularity and the economy. Early studies such as Mueller(1970,1973) and Kramer(1971) were followed by increasingly sophisticated analyses, such as Frey and Schneider(1978,1980) and more recently Gronke(1999, 2000). These studies found that inflation, growth, and unemployment could affect the popularity of governments. Early critics of such work included Stigler(1973) and Hibbs(1974) who attacked both the weak results and poor econometric techniques of the researchers.

[2] Norpath and Yantek (1983) state that *"We may all accept the view that the economy in one way or another affects how people rate incumbent governments, in opinion polls as well as in the voting booth, but we are divided on exactly how it works and how to prove it."* This view is simply bizarre. I certainly do not believe that everyone accepts the premise that the economy affects popularity, nor do I think it possible to prove it. The real question at hand is whether the data show large measured effects that agree with our intuition. This paper argues that the effects, if they exist, are extremely weak.

There are many considerations, which cast doubt on the importance of the economy for ratings. For one thing it is virtually impossible to answer counter-factual questions such as what would have been the economic performance under a different administration. Such considerations appear to leave moot the whole question of what economic variables determines approval, since it is always possible to argue that an alternative administration would have made things worse. One is reminded of the joke of the man who good-naturedly asks another --- "*How is your wife?*" --- to which there is the response --- "*Compared to whom?*"

There are, in addition, a whole host of intervening factors which can lessen the influence of the economy on presidential popularity. Wars, terrorism, personal charisma and character flaws, uncertainty, partisanship and other diversions can turn the attention of the media, and hence the public, from the fundamental economic issues which govern the standard of living and quality of life of the nation. There is again the question of whether indeed it is the sitting administration which is responsible for current economic conditions. Was the prosperity of the 1990's the result of the Reagan revolution during the 1980's? Or, was it the judicious stewardship of the Clinton administration in the 1990's which led to a decade of

expansion and a stock market that was the envy of the world. Finally, it is difficult to ascertain if alternative causes are responsible for economic success or failure. More specifically, are American economic conditions largely governed by institutions and events outside of the control of the executive branch of the Federal government? Many would perhaps argue that the Federal Reserve Open Market Committee has as much power, if not more power, than any sitting president to influence the economy – for better or worse. Surely one must admit that OPEC can affect the US economy, yet it is by no means clear that an American president can significantly influence the setting of OPEC production quotas.

These considerations, and other evidence to be discussed later, lead us to question the strength of the relation between the performance of the economy and US presidential approval ratings. The question posed is an eminently empirical one; one which we can only hope to answer by looking at data.[3] Even under ideal conditions it would be difficult to isolate economic influences from alternative factors in explaining changes in presidential job approval ratings. Yet, it is interesting, not the least to say useful, to know which economic factors appear to have the greatest influence on

[3] While it is true that the data or facts underlie our beliefs, Marshall (1923, Appendix F) said it best when he explained the relation between data and theory in the following way—"Facts are the bricks out of which reason builds the edifice of knowledge". We will similarly make use of facts in our reasoning without abandoning our theoretical underpinnings. Time series analysis, often used in the analysis of presidential popularity, suffers precisely from such abandonment.

popularity, if such influence does in fact exists.

This paper seeks to analyze the influence of particular economic variables, measured on monthly and quarterly frequencies, in hopes of ascertaining the strength of their influence on US presidential popularity ratings. Our study does not ask whether the *election* of any particular president can be explained by economic performance.[4] For the US, that would require a look at the distribution of electoral votes which can be quite different from popular votes – as can be seen from the most recent election. Our study here merely looks at the impact of the economy on periodic job approval survey results. Even so, monthly popularity ratings are an important psychological factor in any election and certainly cannot be ignored by any incumbent president who wishes to retain a second term. Our study does not extend very far into the past; beginning as it does with the initial months of the Kennedy Administration and ending in December of 2003 with G.W. Bush Administration (hereafter taken as Bush, Jr.). However, the fact that we are using monthly data means that we can observe very closely whether short term economic changes (e.g., movements in the unemployment rate) affect short term changes in popularity ratings. In many cases, data for a particular month needs to be averaged, since there was more than one observation for

[4] Quite a large number of economists have looked at whether elections hinge on economic performance. There is indeed a notion of a political business cycle which is largely accepted in economics. The principal reference on the political business cycle is Nordhaus(1975), while the principal references on elections are Fair (1978,1982,1988) and Rogoff and Siebert(1988).

the month. At other times, there are cases in which there were no observations at all during a particular month, resulting in missing data for that month. Such data is typically supplied by means of interpolation. Fortunately, this represents less than 1% of the observations in the total sample.

It would be preposterous to suppose that a *useful* theoretical model could be constructed that would make approval ratings of a sample group rigorously related to a set of macroeconomic variables. Not only would the "average" psychological preferences of voters have to be consistently modeled (something economists long ago found infeasible), but the effect of macroeconomic variables on such a representative's household budget constraint would also have to be specified.[5] For example, at any one time roughly 95% of the US labor force has a job. It is therefore unclear how that a higher unemployment rate would be expected to *precisely* impact on the budget constraint of a representative agent. Whatever effect that is present must enter also through greater uncertainty and consumer pessimism (the strength of which is a social phenomenon) that is associated with higher unemployment and not merely unemployment's impact on a representative agent's level of earnings. Finally, and most importantly, the connection between a sitting president's policy and the

[5] The conditions for a consistent social welfare function can be found in Arrow(1951). In general, we can say that excluding dictatorships, it is impossible to consistently construct such a preference function. In particular, this means that we cannot in general construct a useful social preference function that tells us how that society ranks inflation and unemployment states.

attendant macroeconomic variables would have to be specified – something that is hotly debated at the very center of academics.[6] Since none of these can be convincingly captured using a rational utility maximization paradigm, it follows that only a loose sort of theory can be employed in guiding us as to how that the macroeconomy affects presidential approval ratings. Nevertheless, the loss in deductive precision is more than offset by the gain in freedom of thought; something which a mathematical model would in large measure prohibit.

Given a general theoretical perception of how certain macroeconomic variables affect the lives of most American adults, the issue of how important these variables are in determining US presidential approval ratings is strictly an empirical matter. Our approach is then to construct a large number of regressions over numerous periods and administrations, beginning with the simplest types of explanatory equations and employing a variety of specifications. At times, we will consider the impact of media-related variables. These are economic variables (such as the misery index) which are not necessarily considered of great importance in economics *per se*, but rather upon which the media has fixed its attention. Only the most robust results of

[6] Such considerations lead naturally to the issues in economics of the neutrality of money, policy ineffectiveness, lags in the implementation and effects of fiscal and monetary policy, the issue of fixed vs. flexible exchange rates on policy, etc. During the 1970's the question of how that expectations might render changes in policy impotent were thoroughly discussed—essentially with no firm conclusions despite being extremely influential. See for example, Lucas(1973), and Sargent and Wallace(1975). Note that if anticipated policy cannot affect real variables in the economy, then there is a disconnect between the performance of the economy and the president.

our analyses are accepted as having any probative value and will therefore be presented here. Stability of the results is also a key criterion on which we base our conclusions.

In general, we find the following key results from the analysis.

First, for the period 1961:02 ~ 2003:12, both monthly observations on US presidential approval ratings and end-of-period quarterly observations are remarkably well explained by a pure autoregressive process of order one. The process is extremely stable over decades of data. The best explanation for this is that approval ratings are probably governed in large measure by party affiliation and people typically change such affiliations quite infrequently — this being largely determined by slow political changes and more importantly by demographic changes. What is important is that these long secular movements in approval ratings are not sensitive to economic factors. The fact that both monthly and quarterly observations show precisely this type of time series representation is a testament to the stability of this result. Approval rates are extremely long memory processes and both positive and negative shocks to approval rates are slow to work their way out.

Second, if we consider approval ratings of the US Presidency over the whole period, we find that such a *generic* president is apparently affected by certain aspects of the economy. The effects are statistically significant, but they are not of practical significance. ***What this means is that the data shows that the non-zero measured effects of certain economic variables (assuming the null of a zero impact) are highly unlikely to have occurred by chance, but the effects are nevertheless relatively small in magnitude.***[7] The economic variables do not explain much of the variation in approval rates that are not already explained by lagged values of approval rates themselves. This is curious and is worthy of closer inspection and discussion.

Third, the two economic variables which show greatest importance, regardless of whether one considers monthly or quarterly observations on approval ratings, are the unemployment rate and the inflation rate. A novel aspect of this is that both the unemployment rate and the inflation rate affect the approval rating by interacting with a lagged (exponentiated) approval rating. A higher unemployment or inflation rate *ceteris paribus* will typically reduce the current approval rating by a small amount; but this impact is enhanced the higher the lagged approval rate that exists at the time. A president who is currently enjoying a high approval rating will be hurt

[7] There is an important distinction between *statistical* significance and *economic* or *practical* significance, although it is seldom for economists to distinguish between the two. See McCloskey (1983) with respect to the distinction between the two meanings of significance. We will try to maintain the distinction.

comparatively more by an equal rise in unemployment, than a president who is suffering a low approval rating. The existence of the interaction between inflation or unemployment and lagged approval means that the marginal effect is not constant.[8] On the whole, a rise in inflation causes a reduction in presidential approval. This is interesting since inflation is often associated with an economy which is overheating or expanding too quickly. Economists have generally agreed that the costs of inflation are negligible if annual inflation is below 10% and is stable and predictable. One must wonder what it is about inflation that causes Americans to vent their frustration on US presidents whenever inflation rises. The individuals who are most hurt by inflation tend to be bond holders and holders of large cash balances, who suffer real capital losses from the attendant rise in nominal interest rates during an inflation. This group represents a small proportion of the population and certainly a small proportion of the groups sampled by the Gallup Organization. An alternative explanation—one which is loathed by economists – is that the public is simply suffering from "*money illusion*". They see prices rising whenever there is inflation, but they do not see the (necessary) concomitant increase in their nominal incomes at the same time. The rise in prices, which is perceived as being unaccompanied by a

[8] The marginal effect of a variable z is the partial derivative of the regression equation with respect to z. Clearly an interaction term makes this non-constant. The novel aspect of our formulation is that the interaction term involves unemployment rates and inflation rates being multiplied to lagged (exponentiated) approval rates. This complicates both the dynamics of the regression and the inferences that can be drawn.

commensurate increase in money income, reduces purchasing power and is opposed by the public, who in turn lower their approval rating of the president.[9]

Fourth, trade deficits, business cycles, oil prices, and interest rates do not appear to have statistically significant (nor practical significant) effects on the approval ratings. These variables are highly interrelated and are moreover related to inflation and unemployment, as well. It is not clear why that Americans should be concerned with the trade deficit. The deficit is mainly the result of excessive spending by government and consumers and therefore a high trade deficit could easily be associated with greater approval (not disapproval) of the US president. The business cycle is, of course, highly correlated with unemployment, through a stable relation known as Okun's Law and therefore it is not likely to have any additional effect on approval apart from that contained in unemployment. Oil prices have had dramatic effects on the economy through supply side effects, but these occurred during two periods only, both of which were in the 1970's. The president is unlikely to be held responsible for controlling such prices, since they are mainly determined by the international cartel, OPEC. While it is true that interest rates are closely correlated

[9] It is now well accepted that the long run Phillips curve is vertical. Most economists cannot accept the idea that people can be fooled by changes in prices. The simplest way to understand this is to see that a redenomination of the currency should have no effect on real resource allocation. Friedman (1968) is the seminal reference on the notion that predictable inflation should have little effect on the economy. Extremely high rates of inflation act as redistribution schemes between the government and the public, as was discussed early on in Keynes (1923).

to inflation, they are nevertheless a good indicator of tightness in the credit markets, which has a direct bearing on consumption and investment decisions of the public. Presidents are often held responsible for the level of interest rates, despite the fact that such rates are more the province of the Federal Reserve. Finally, we did not find any particularly close relation between consumer confidence and presidential approval. [10]

Fifth, the response of the approval ratings of each president over the period 1961:2 ~ 2003:12 to changes in economic conditions shows considerable *qualitative* uniformity and *quantitative* variability. Approval rates clearly are negatively related to unemployment for all nine presidents studied. The negative unemployment effect was strongest for Nixon and Ford, and was weakest for Reagan. A negative inflation effect was present in seven of the nine presidents. The strongest negative inflation effect was experienced by Nixon, and was weakest for Reagan and Bush, Sr. These results lend credence to the notion that Reagan was truly a "Teflon" president. Inflation and unemployment had the greatest explanatory power with respect to approval rates during the Ford and Bush, Sr. presidencies. They had the least explanatory power during the Kennedy and Johnson administrations.

[10] A IPOSOS-Public Affairs/Cook Political Report Poll released June 9, 2003 shows that consumer sentiment (measured by the Ipsos National CASH index) has tracked presidential approval rather closely during the period July 2002 and June 2003. My own calculation of the data shows the logarithmic differences of the two variables display a Pearson correlation coefficient equal to 0.66, which is an incredibly high correlation for differenced variables. Nevertheless, if we consider the Michigan consumer confidence index over the whole period 1961-2003, we fail to see such a strong correlation. Regressions including this index similarly fail to be statistically significant.

Finally, a statistical test was made of the equality of impacts from inflation and unemployment (weighted by lagged approval) over the total period of the nine Presidencies. An F test indicated that the hypothesis of equal impacts from a 1 unit increase in inflation or weighted unemployment could not be rejected. This means that a type of misery index appears to exist—one that is the sum of the inflation rate and the unemployment rate. According to these statistical results, the public sees these two as equal evils, but economists typically feel unemployment is a much more serious problem.[11]

II. A Theoretical Framework

Presidential popularity ratings represent an index of public sentiment on how well the current president is doing. This scalar index (Y_t) is clearly determined by a multitude of factors. Despite the large number of determinants, we may separate such factors (somewhat artificially) into two vectors: one economic (X_t) and the other

[11] We should be careful here for two reasons. First, such a statement borders on asserting a particular set of social preferences, something long ago suspected by economists. Second, we know that the costs of unemployment (via Okun's Law) are much greater than the costs of low inflation (e.g. shoe leather costs, etc.) See Gordon (2003) for discussions of Okun's Law and the costs of inflation. It therefore seems odd that the public would equate the two. The inclusion of inflation in models of presidential popularity is seldom criticized, even though we know that the social costs of inflation are miniscule. This issue, along with the apparent statistical significance of inflation in popularity regressions, is worthy of serious study on its own.

non-economic (Z_t). As a first approximation, we can assume that the current value of the index can be written as a unique and stable function of the *current* values of these factors

$$Y_t = \varphi(X_t, Z_t)$$

The economic factors contained in X_t are assumed to directly impact on the incomes and prices of those surveyed and thus to influence the public's views of the effectiveness of policymakers, who are seen by the public to be in a position to alter outcomes one way or another. Note that such a formulation fails to capture many important aspects of the problem we are considering. First, economic conditions should ordinarily be judged in light of what might be considered a "normal" level of economic activity; something which quite possibly changes over time. Individuals who come to expect a high rate of inflation tend to adjust their expectations so that actual inflation has comparatively smaller real costs. A society which normally experiences 5% unemployment will react differently to a 1% drop in this rate than a society accustomed to a 10% unemployment rate. Second, a change in economic conditions must persist if they are to be considered significant. A single month's fall in the unemployment rate cannot be expected to have as strong an effect on individual perceptions as a secular fall over a year. This means that responses to economic

events may involve lagged reactions on the part of the public and be cumulative in their response. The extent of this lag, if it exists, could in principle be estimated empirically. Third, there may be interactions between non-economic factors (Z_t) and economic factors (X_t), as is the case for armed conflicts and national disasters. [12] The formulation (1) does not explicitly take this into account. Conceptually, one could introduce a composition of functions, say $X_t = \psi(Z_t)$ and $Y_t = \varphi(\psi(Z_t), Z_t)$, but this just adds the further complications of identifying the function ψ and assuming it is sufficiently stable to substitute for X_t itself. Finally, the formulation above rules out Y_t from being influenced directly by previous values of Y_t. However, there is nothing to prevent popularity ratings being influenced by popularity itself. Nothing succeeds like success and if a president is well liked, it may be natural for people to want to *continue* to support such a person, even when circumstances change. Not only is this true for people who want to maintain consistency in their value judgments and party affiliation, it is less socially divisive. Party affiliation is no doubt an important determinant of approval ratings. Republicans tend to support their president, regardless of the state of things. Democrats likewise are unlikely to change their approval of a Democratic president, unless there is manifest

[12] Clearly the Vietnam War had a dramatic effect on the US economy. It was during this time that Lyndon Johnson decided to finance the war by issuing bonds, which were subsequently monetized by Arthur Burns, the chairman of the Board of Governors of the Federal Reserve System. This monetization of the debt was the initial cause of the high rates of inflation during the 1970's and which led to the stupendous drop in output in 1982, when monetarist policies were implemented by Reagan and the Fed. For more on demand and supply shocks, see Gordon (2003, p.453).

incompetence or malfeasance. While it may be easy for the popularity of any particular President to change with changes in circumstances, it is much harder and indeed costlier for people to change their party affiliation when disaffected. It follows that if party affiliation is an important determinant of approval ratings, then Y_t will change slowly and will display all the features of a long memory autoregressive process. ***As we shall see, high popularity means that some support is coming from members of the other party. This support is easy to erode whenever there is a slight change in circumstances.*** Similarly low popularity means that only hard-line supporters are left. Any change in the economy is therefore unlikely to have a large effect on popularity. It follows that high popularity is associated with large negative responses to bad economic performance, and low popularity is associated with weak responses to negative economic performance. Oddly enough, this observation has not been made before in the literature.[13] Moreover, it will be decisive in determining

[13] Some researchers have come close to this observation. They have remarked that there are lags in the effect from changes in economic conditions. These lags drop off with the passage of time and therefore the impacts drop off, as well. The coefficients on the lags therefore become smaller as the lag length increases. This may well be true, but it does not address the issue that a high popularity should weight the impact coefficient of say, unemployment or inflation. This idea is actually closely related to similar arguments Milton Friedman made regarding the reasons why that cross sectional studies of consumption differed with long run time series studies of consumption. One might well say that there is a permanent popularity and transitory popularity. A high popularity is likely to have a high transitory component, rather than being due to a high permanent component. A good example of research on lagged effects on popularity can be found in Monroe (1978). Gronke (1999, p.31) has come close to understanding the point raised here. He states that " strong partisans form the bulwark of a president's support (and opposition), and our regression models ought to take this increased confidence into account. Similarly, president' s (sic) are not only likely to gain less approval from weaker partisans, but they ought to be less confident in any particular expectation, even given other events may play into their favor (e.g. good economic news and beneficial issue positions)." This is close to our argument here. A better approach would be, as suggested above, to decompose popularity in to permanent and transitory components, something which has yet to be accomplished.

the structure of our empirical model. Lagged popularity (properly transformed) is later seen to interact directly with both inflation and unemployment in our regressions.

An important non-economic factor which reoccurs every four or eight years is a possible change in presidents. It is clear from the data that a new and untested president is given a high approval rating at the beginning of their term and that this approval then typically falls over time. This is true for almost all presidents. It follows that any econometric model of approval ratings should explicitly incorporate this phenomenon.[14]

It is also true that wars, catastrophe, scandals, and terrorist events bring the nation together and raise or lower the approval rating of a president quite independently of how the economy is doing. This is clear from the assassination of Kennedy, the Kuwaiti War of the early 1990's and the events of September 11, 2001. In fact, one could say that approval ratings tend to move monthly with the unpredictable changes

[14] Stimson (1976) has made the dramatic statement that presidential approval may be wholly independent of the President's behavior in office. He claims that most presidents show a similar pattern: (i) popularity during the honeymoon period, (ii) a parabolic decline in popularity, (iii) a steady holding pattern giving way to (iv) a slight increase in approval prior to the election. This type of analysis is strikingly similar to technical analysis in the stock market. It is not borne out in all cases, however. The honeymoon period is certainly clear and we will therefore model it using a dummy variable. The parabolic decline is merely error correction based on unrealistic optimism with the new president. The real question is to effectively explain the short run fluctuations in popularity.

in the fortune of the nation. This makes the creation of a general model of the determinants of presidential approval ratings quite problematic. It is simply impossible to add separate dummy variables for each *unique* event and still maintain sufficient degrees of freedom to ensure precision in estimation.

III. Empirical Model

The above section lays out the case for making presidential approval ratings a function of lagged values of itself, certain economic variables, and possibly some judiciously chosen dummy variables. Slowly changing variables, which are functions of still other variables, have typically been modeled in economics with a partial adjustment mechanism.[15] This model posits some desired level or optimized quantity and then imposes a slow movement towards this amount. Using our notation above, we might write

$$Y_t - Y_{t-1} = \beta (Y^*_t - Y_{t-1}) + \varepsilon_t$$

where $Y^*_t = f(X_t, Z_t)$ and where ε_t is some stationary random variable, statistically

[15] The partial adjustment mechanism has been replaced somewhat in economics by error correction models, which involves regressions on non-stationary time series. Unit root tests were run on the logarithm of presidential approval and unit roots were soundly rejected. This means that neither cointegration, nor error correction, are appropriate vehicles for our analysis of presidential approval.

independent of both X_t and Z_t. Note that this formulation makes Y_t a function of itself lagged one period, as well as the economic (X_t) and non-economic (Z_t) variables. We may now postulate certain restrictions on the function f(-) such as making it linear in the variables with coefficients having particular determinant signs. We might assume that both inflation and unemployment enter the X_t vector and that increases in either will result in a lower value of Y^*_t. The formulation above is very common in the economics literature, although it has lost some of its appeal with the new econometrics of non-stationary time series. One problem with this formulation is that it excludes possible interaction between the Y_{t-1} variable and X_t variables. Such interaction terms are common in statistics, but interaction between exogenous variables and lagged dependent variables is something entirely new. Indeed, it is not at all clear what the distribution of the least squares estimators are when there are interaction terms between lagged dependent variables and exogenous variables. To make this more explicit, consider the following formulation.

First, the approval rating Y_t is bounded between 0 and 100, and therefore we convert Y_t to a logistic variable by use of

$$y_t = \log[\, Y_t/(100 - Y_t)\,]$$

This has the advantage of letting y_t extend over the whole real line, so that it can be properly modeled by a normal random variable.[16]

Second, we introduce a linear regression model with interaction between y_t and the unemployment rate, u_t and the inflation rate, π_t. Assuming a dummy variable, D_t, for unusual events also affects approval ratings, we have the following equation

$$\Delta y_t = \beta_o + \beta_1 u_t \exp(y_{t-1}) + \beta_2 \pi_t \exp(y_{t-1}) + \beta_3 D_t + \varepsilon_t$$

where $\Delta y_t = y_t - y_{t-1}$. This particular formulation (which we might term pathological interaction) implies that changes in the unemployment and inflation rates will have stronger effects the higher the popularity of the president in the previous period, y_t. We might speculate that this is because a very well-liked president will have a large number of the ***opposing*** party members who approve of his presidency. These individuals are quick to fall away and withdraw their support during times when the economy turns bad. By contrast, a president who is currently experiencing a low approval rating is likely to draw principal support from many die-hards who are less

[16] See Ramanathan (2001) for a discussion of non-pathological interaction terms and the concept of logistic regressions.

affected by economic bad news. Thus, a president with a high approval rating is more vulnerable to bad economic events. This justifies the use of the exponential interaction term in the regression.

Note that the term y_{t-1} does not enter linearly into the regression equation because that would force β_1 to change sign whenever y_{t-1} changed sign. We assume that $\beta_1 < 0$, $\beta_2 < 0$, and that both are parametric constants. Naturally, there are other economic factors, which could be considered in the regression, such as the trade deficit (as a percentage of GDP), the level of interest rates, percentage changes in oil prices, etc. We have chosen to ignore these variables since regressions including these and their interaction terms were tried and ultimately proved to be statistically insignificant. It may be that these variables are in fact related to changes in the approval ratings, but if so, they make themselves felt through nonlinear and rather convoluted channels. There is no clear- cut relation between these additional variables and presidential approval ratings.

We should point out that it is certainly possible to generate standard regressions of the following type

$$y_t = \beta_o + \beta_1 y_{t-1} + \beta_2 u_t + \beta_3 \pi_t + \varepsilon_t.$$

However, the results of such regressions are manifestly inferior to the interaction specification above, as judged on the basis of a number of different criteria. Despite this, it is true that, statistical significance aside, the signs on such regressions agree with our expectations. That is, over many types of specifications, we find that unemployment and inflation are negatively related to presidential approval ratings. And, such effects are extremely small compared to either lagged response or the unexplained movements in ratings. We should also note that omitting the lagged term creates unacceptable levels of autocorrelation in the residuals, heavily biasing the standard errors and rendering useless any inferences made from the statistical estimates of the effects.[17] Differencing the data, increasing the number of explanatory variables, and introducing nonlinearities do virtually nothing to help improve the regression diagnostics and goodness of fit statistics.

The pathological interaction formulation above creates inferential difficulties since the usual t-statistics of common regression no longer have their typical distributions. To

[17] Standard multivariate regressions of approval rates on unemployment, etc. with no lagged dependent variables result in very poor regression diagnostics. The high degree of autocorrelation that one finds leads one to think that such regressions suffer from spurious correlations. The regressions are "unbalanced" in the sense that the time series properties of the dependent variables are very different from the time series properties of the explanatory variables. It follows that very little in the way of inference can be drawn from the regressions, except to say that the variables explain very little.

solve this problem, we have undertaken a small scale Monte Carlo experiment to roughly ascertain the nature of the distributions of the estimators for the coefficients in the regression; particularly those associated with the interaction term. Using 20,000 replications, a similar type of regression, each replication having 100 observations, was estimated and analyzed. The resulting 20,000 t-statistics were then collected together and fractiles were computed indicating the critical regions for significance testing. We found that the OLS estimator for the interaction coefficient is indeed biased and t-tests are similarly altered. The coefficients on non-interactive terms, including the constant term, are not affected by inclusion of the interaction term. These results are themselves of academic interest and point to possible new ways of constructing regression equations. They are not the focus of our topic here, so they will not be discussed in detail.

IV. Data and Limitations on Analysis

There is certainly no shortage of data on US presidential approval ratings. The real issue concerning data is to find a consistent series where sampling questions are roughly uniform, sample size is stable, and where sampling done at regular intervals. The Gallup organization provides one of the best services (though still incomplete).

The series extends back to F. Roosevelt, but clearly there is infrequent sampling prior to Kennedy. For this and other reasons, our sample consists of Gallup data sampled at least one time per month beginning in 1961:01 and ending 2003:12. Multiple observations during any month were averaged together weighted by sample size, which is typically around 1000 – 2000 persons. Percentages were then rounded off; e.g. 51.5% was taken as 52%. [18]

There are numerous other issues involved in approval ratings. For example, there are two types of approval ratings – one being a job approval rating and the other being a personal approval rating. We have chosen job approval for this study, since it is the rating most likely to be related to economic variables.

Yet another problem with data is that some variables, such as GDP and trade statistics, are observed only on a quarterly basis. By contrast, unemployment and inflation are observed on a monthly basis. Many of the variables we use are seasonally adjusted, while the public may or may not take such seasonal factors into consideration. Both monthly and quarterly data are used in our analysis, and the results are very close,

[18] It should be noted that there are a number of sources which have data on presidential approval. As mentioned, the Gallup organization http://www.gallup.com/ , which is reproduced in greater detail at the Roper Center website found at http://roperweb.ropercenter.uconn.edu/ . There is also an ongoing project at http://www.unc.edu/~beyle/jars.html . We have made use of the Gallup data, supplemented by last of these sources and by interpolation when necessary.

which demonstrates short run temporal stability.

Another problem concerning data is that published inflation and unemployment rates are often lagged and revised (sometimes more than once). The public is typically told of April's inflation and unemployment rates in May. In fact, these rates are then subsequently revised, often more than once. This makes the specification of a precise temporal causation problematic. There is very little that can be done about this, except to experiment with different lag structures.

A Monte Carlo experiment for determining appropriate critical regions for the common t-test, in the presence of lagged interaction terms, was simulated using RATS, while all other regressions, diagnostics, and graphics used the freeware GRETL and PrintKey 2000.

The basic descriptive statistics on presidential approval ratings are contained in

President	Period	Mean	Min	Max	St. Dev.	Sample
Total	1961:1~2003:4	55.314	26	88	12.1	172
Kennedy	1961:1~1963:3	71.8	61	80	6.68	10
Johnson	1963:4~1968:4	55.64	36	77	13.56	22
Nixon	1969:1~1974:2	50.32	26	64	11.4	22
Ford	1974:3~1976:4	48.8	38	63	7.63	10
Carter	1977:1~1980:4	46.25	29	73	12.38	16

Reagan	1981:1~1988:4	53.3	41	67	7.32	32
Bush, Sr.	1989:1~1992:4	60.63	37	86	14.05	16
Clinton	1993:1~2000:4	54.9	38	67	7.51	32
Bush, Jr.	2001:1~2003:4	67	51	88	12.11	12

Table 1: Basic Statistics on Presidential Approval Ratings

Source: Monthly Data taken from the Gallup Organization. Converted to End of Period Quarterly Data – Author's calculations using Gretl freeware. See Cottrell (2001) for details about the software.

Table 1. In general, US presidents have on average enjoyed about a 55% approval rating. Approval ratings have rarely dropped 20 points below this level, nor has it risen 20 points above this level.

The time series properties of the presidential approval rates are quite striking. The sample autocorrelation function and sample partial autocorrelation function show that $y_t \equiv \log [pos/(100\text{-}pos)]$ is a pure autoregressive process. These functions are shown in Table 2. The first three sample autocorrelations are $\hat{\rho}_1 = 0.762$, $\hat{\rho}_2 = 0.601$, $\hat{\rho}_3 = 0.50$ and this accords well with an AR(1) process. Note that the sample PACF cuts off sharply after the first lag which is indicative of an AR(1) process. An AR(1) process was estimated and the results of this estimation is contained in Table 3. The results show that the estimated residuals coming from such a model are essentially white noise. This makes it extremely difficult to model any residual variation in the data. In other words, ***any*** model seeking to explain y_t and which includes lags of y_t

will leave very little variation to be further explained. Moreover, any additional explanatory variables which are added to such a model must also be essentially white noise processes and this rules-out almost all economic variables, since economic variables nearly always show some form of serial correlation (even after log differencing). This is an important point which goes a long way in explaining why it is difficult to explain

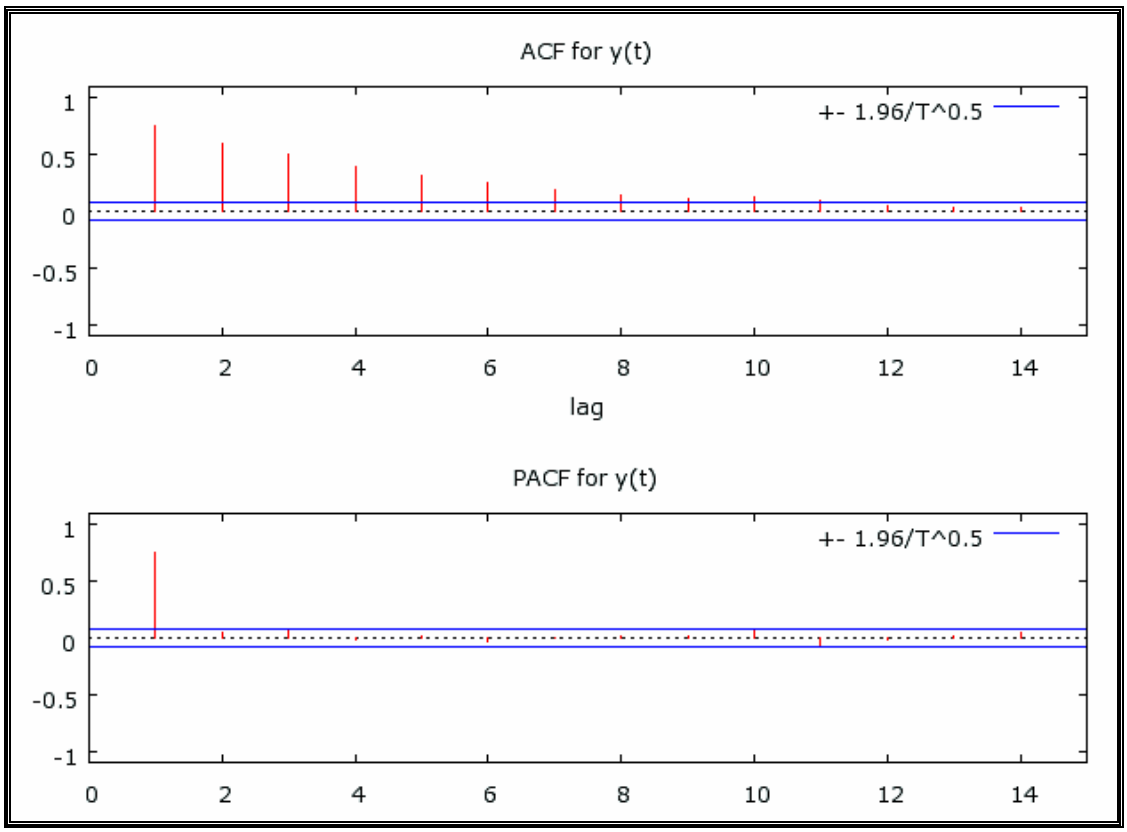

Table 2: Sample ACF and PACF Functions
Graphics: Gretl and PrintKey2000

variation in approval ratings using economic variables. With respect to the question of whether y_t has a unit root, both Dickey-Fuller and ADF tests were run and soundly

rejected the null hypothesis of a unit root at the 1% significance level. Thus, regardless of whether we look at quarterly or monthly data, y_t does not appear to have a unit root, although *monthly* data indicates a first order autoregressive process with a first order autocorrelation coefficient equal to 0.92, which is clearly close to unity.

There are some very important periods of US history which have impacted on presidential approval ratings. These statistical outliers are perhaps best modeled with a single dummy variable.

The first of these is the Kennedy assassination on December 22, 1963. This ended

Estimated Quarterly AR(1) Model : $y_t = \varphi_o + \varphi\, y_{t-1} + \varepsilon_t$ Obs. = 172			
Coefficient	Estimate	t-statistic	p value
φ_o	0.24617	2.27	0.012
φ_1	0.76184	15.42	0.0001
Adj. R^2 = 0.578		D-W = 2.068	

Table 3: Time Series Estimation of y_t = log[pos/(100-pos)]

the Kennedy presidency and initiated the Johnson Presidency. What is essential is to

note that Johnson enjoyed immense popularity as a result of the national grief and the need to achieve some measure of hope for the future.

The next major period was in August of 1974 with the resignation of Richard Nixon. The public was fatigued with Watergate and sought relief in the constitutional successor Gerald Ford. Ford was clearly not liked beginning with a 63% approval rating and ending with a 38% rating. This shows how that untested presidents are often accorded a high approval when acceding to the office.

The next clear outlier in approval ratings occurred in early 1991 with the first US-Iraq War. George Bush, Sr. was given a resounding approval rate in excess of 80%. This rate subsequently plummeted to 37% in 1992. Once again we see that such shocks (both positive and negative) are very powerful, but do not last very long.

The last outlier chosen is that associated with September 11, 2001. This event had the greatest impact on approval ratings over the forty year period observed. The Bush, Jr. approval rating rose to nearly 90% and subsequently fell to 51% in 2003. This shows again that such events have enormous influence on the approval ratings, but cannot be sustained. Most ratings for US presidents revert to the mean of 55%,

which is understandable since the time series analysis indicate that approval rating is mean-reverting process. [19]

In general, each new or untested president (not second term) experiences a rise in approval rating which is grounds for including this as an outlier or dummy variable. In addition, there are unusual events such as assassination, resignations, wars, and terrorist events, which also drive the approval ratings higher for certain president. These events may be broadly grouped together and their impact on approval ratings can be studied quantitatively.

V. Estimation Results and Inference

The model we have constructed can now be estimated over the whole period and for the relevant sub-periods.[20] The results for the overall regression using quarterly data are given in Table 4, while the results from the quarterly sub-period regressions are

[19] A mean reverting time series is one which is covariance stationary and has an autocorrelation function which declines rapidly as the lag length increases. A mean reverting time series can be contrasted to a non-stationary series which tends to meander and whose conditional variance expands as time progresses. Such a non-stationary series does not have an unconditional mean and will not move towards any particular value as time passes. Presidential approval is quite clearly a mean reverting time series.

[20] Most studies look at the whole period and do not consider sub-period regressions. However, regressions over the whole period have an entirely different interpretation. As we have pointed out, regressions over the whole period provide us with information on a "generic" presidency. There is no reason to suppose that *any* president conforms to such a "generic" presidency, just as no single member of a population may be equal to the population average.

contained in Table 5. Similar results for monthly data (as opposed to quarterly data) are given in Tables 6 and 7, respectively. Table 4 provides a kind of benchmark to compare the presidencies in the various sub-periods. Clearly both inflation and unemployment are statistically significant determinants of the change in presidential approval ratings. Higher values of inflation or unemployment can be expected to reduce the job approval ratings of a typical president. From the coefficient on the dummy variable, we see that wars, terrorist events, and the like tend to raise ratings, y_t, by about 0.98, which translates into an increase in job approval ratings of over 24 percentage points (measured from the mean of approval ratings, 55%--see Table 1).

Estimated Regression Equation
Quarterly Data 1961:2~2003:4

$$\Delta y_t = \beta_o + \beta_1 u_t \exp(y_{t-1}) + \beta_2 \pi_t \exp(y_{t-1}) + \beta_3 D_t + \varepsilon_t$$

Least Squares Estimates – t-statistics in parentheses

β_o: 0.139 (3.54) β_1: -0.01 (-2.42) β_2: -0.026 (-3.48) β_3: 0.968 (11.51)	adj. R^2 = 0.52 D-W = 2.02 p-value of F = 0.001

Table 4: Overall Presidential Approval Ratings Regression

In other words, a sitting president who is currently enjoying a 55% approval rating

will typically see such ratings initially rise to 79% for events such as wars, terrorist events, assassination attempts, etc. In the absence of other events, these ratings will then begin to drop back to their mean of 55%. The performance of the economy merely hastens or retards this movement back to the mean. This measurement essentially lets us know how much the president could "wag the dog" if necessary. It is considerably stronger than any improvement in the economy. This is worrisome indeed.

It is possible to test the hypothesis that $\beta_1 = \beta_2$, in which case inflation and unemployment have equal impacts on the job approval rating of the generic president. A typical F-test was run to see whether or not the constraint was binding. The p-value on the F statistic was 0.48 and thus, the hypothesis that β_1 is equal to β_2 cannot be rejected. This means that the popular notion of a misery index is empirically justified. The estimated coefficient on such a misery index is -0.015, which understandably lies between the estimates of β_1 and β_2 in Table 4.

Once again, caution is needed here. While it is true that from a *strictly statistical* point of view, inflation and unemployment have equal impacts on approval ratings, the magnitude is surprisingly small. For example, the average value of the misery

index (i.e. the inflation rate + the unemployment rate) over the entire sample period is equal to 10.45 (with a median value of 9.8). Let's suppose that the index rose substantially from 10% to 15%. This would be an increase of 5 percentage points in "misery", either through increased inflation, increased unemployment, or both. If we assume that the president is currently enjoying an average approval rating of 55%, how much would this increase in misery reduce his or her ratings in the next quarter, *ceteris paribus*.[21] To find this we would multiply 5% to the estimated coefficient -0.015 and this would then be multiplied to $\exp(y_{t-1}) = 1.22$ to get the change in y. The change in y translates into a mere 2.7 percentage point fall in approval ratings for one quarter.[22] This is amazing since a five percentage point rise in the misery index *within one quarter* would be generally thought of as catastrophic. The paltry response, if the estimates are valid over such large changes, indicates just how unimportant the economy is in deciding approval ratings.[23] This is a point rarely heard in reasoned discussions of the economy and politics. Most people simply take it as given that the economy is an important determinant of such survey outcomes. The data says otherwise. [24]

---

[21] Naturally, a presidential approval rating of 55% is equivalent to y = 0.2006.

[22] Kenski (1977) has found that inflation is not very important in determining presidential popularity. This seems to accord well with our findings here.

[23] We must guard against extending the use of our regression model beyond the typical bounds set by our data. A rise of 5% in the misery index in a single quarter has only perhaps occurred during the Great Depression.

[24] Lanoue (1987) has claimed that unemployment does a poor job of explaining presidential popularity, while inflation appears to do a better job. He also argues that income (or income cycles) should be included in the model in order to capture the effects of the business cycle. We would argue here that

The regression in Table 4 is unusual for many reasons – not simply because of the peculiarly small magnitudes associated with inflation and unemployment. For one thing, the regression is extremely stable, despite the fact that we have estimated it over about 170 quarters of data. Using either the Chow test (centered at 1980:1) or the CUSUM test, we find that the regression estimates are surprisingly stable. There does not seem to be much in the way of structural change in the equation over the sample period. This lends greater weight to the findings since it refutes the typical charge that no fixed quantitative relationship could exist over such a long period. Stability tests are typically the hardest of the tests to pass in empirical economics. The regression equation in Table 4 is extremely stable judged by these criteria.[25]

Both inflation and unemployment coefficients appear to be statistically significant. However, it should be noted that both inflation and unemployment variables have been multiplied by a lagged dependent variable, which has itself been exponentiated. The use of these interaction terms alter the typical distribution of the estimators and in

---

the data seems to say that inflation is important during the 1960's and 1970's, while unemployment is important during the 1980's and 1990's. Kenski (1980) has argued that inclusion of closely related variables may generate unreliable estimates. This is just the heteroskedasticity problem. We have corrected our estimates for heteroskedasticity when possible.

[25] One of the earliest and most insightful criticisms of econometrics was Keynes (1938) who noted that parameter estimates of econometric studies would no doubt be constantly changing – that is, the regression would be unstable. Keynes felt that econometrics would always suffer from this type of drawback. Both the Chow test and the CUSUM test attempt to address these criticisms.

particular, bias the t-tests downward – as is the case in regressions involving integrated variables. [26] To provide a closer measure of the statistical significance of these variables, a Monte Carlo experiment involving 20,000 replications of a regression having 100 observations was undertaken. The 20,000 t-test statistics were collected together and an empirical distribution was constructed given a null hypothesis that the coefficient was zero. The 2.5% critical values for the standard t-test would be roughly ± 1.98. However, for lagged interaction terms such as found in Table 4, the critical values shift leftward by about 0.5 (i.e., the values become -2.48 and 1.48, respectively). Thus, we should say that β_1 is only *marginally* significant at the 5% level, while β_2 is fully significant at the 5% level. Moreover, a restricted regression involving a misery index is fully significant at the 5% level. Again, it should be emphasized that statistical significance certainly does not imply practical significance, especially with respect to the regression we are considering here.

The regression in Table 4 was tested extensively for autocorrelation in the estimated residuals. Using a Lagrange multiplier test over numerous lags, autocorrelation was soundly rejected.[27] This is important since autocorrelation in the presence of lagged

[26] It is interesting that our monte carlo analysis showed that the distribution of the standard t-statistics remained roughly symmetric. There was merely a shift of the distribution to the left.

[27] The standard Durbin –Watson statistic is not valid when there is a lagged dependent variable in the regression. Note that our regression has an (exponentiated) lagged dependent variable which is interacting with the exogenous variables. The distribution of the Durbin-Watson statistic (or Durbin's h-statistic) is unknown under these conditions. As an alternative, we use the Lagrange Multiplier test

dependent variables can introduced bias and inconsistency into the least squares estimators. Fortunately the residuals from the regression appeared to be white noise. This lends greater credibility to the results, since inclusion of variables, such as unemployment and inflation, which are clearly autocorrelated, do not give rise to autocorrelation in the residuals.

Numerous other variables were included in the regression in Table 4, including the trade deficit (as a percentage of GDP), consumer confidence, interest rates, the percentage change in oil prices, etc. None of these variables were seen to be statistically significant over the entire period covered and are not shown here to conserve on space. Among these, consumer confidence is the most appealing variable for inclusion, but apparently consumers neither blame nor credit the president for the situations which change their confidence in the economy. Perhaps this is because confidence is a forward looking variable and a single president cannot be rightly held responsible for the future. Rather it is a collective set of presidents and Congresses which are thought to be jointly responsible. One cannot blame Ronald Reagan for the attendant recession from attempting to reduce inflation, if such inflation was the direct result of excessive spending and money creation during the

---

statistic to test for autocorrelation. This test is very robust. For more on this test, please see Ramanathan (2001).

1960's and 1970's. In this sense, it makes just as much sense to blame Lyndon Johnson for the recession in the 1980's as it does to blame Ronald Reagan – despite the fact that Johnson was dead long before this.[28] The economy, with its lags in effects, and the public, with their lags in perceptions, come together to make the effect of the economy on presidential approval ratings virtually negligible.

Turning now to the sub-period estimations contained in Table 5, we see a very striking result, which has been emphasized by shading the particular periods. The dark gray shading in Table 5 indicates periods which had statistically significant impacts from inflation, while the light gray shading shows periods which showed statistically significant impacts from unemployment. Note that the sample period is cut roughly in half by these effects. In the first half, inflation proved to be significant, while in the latter half, unemployment proved to be more important. This accords well with our intuition about US economic history. The inflation caused by the monetization of deficits due to the Vietnam War and Great Society programs begun in the Kennedy-Johnson administrations and by the oil crises during the 1970's, led subsequently to the high unemployment rates in the 1980's and early 1990's. The virtual disappearance of inflation from American society has made unemployment the

[28] Perhaps it would be proper here to point out that the public gets a large measure of its information on the performance of the economy and the links this might have from so-called experts in the media. There has been some studies that show that this filtering of information has a direct effect on the popularity ratings a president enjoys. See Nadeau et al. (1999).

only clear economic issue of concern to those sampled.

The estimated constants β_o for the Kennedy and Bush, Jr. administrations are not significantly different from zero. One possible explanation for this is that both presidents took office under a cloud of suspicion regarding their elections. Kennedy narrowly defeated Nixon, with some saying that Nixon probably garnered more popular votes.[29] Bush, Jr. likewise won the election, but ostensibly had less popular votes, although it is hard even today to say what the popular vote actually was. [30]

The sub-regressions show great variability, but it must be understood that each regression has very few observations and therefore each suffers from a degrees of freedom deficit. The regressions also show a high degree of autocorrelation in the residuals.

If we consider monthly observations, we can repeat the above two analyses for the sake of comparison. Table 6 shows the results of the regression on monthly data using the same model as quarterly data for the entire period 1961~2003. It is

[29] A detailed map showing the electoral votes during the 1960 election can be found at http://www.harcourtschool.com/activity/electoralcollege/college_nixon.html

[30] Many states did not bother to count absentee ballots after it was clear that the state had been won by a particular candidate and the electoral votes decided. This makes it unclear what would have been the actual popular vote for the entire country.

immediately clear that the results are very similar. The adjusted R^2 is decidedly lower, but that is to be expected since we have increased the frequency from quarterly to monthly data and therefore we have increased the variety of influences that affect approval rates. Both inflation and unemployment have like signs and are very close in magnitude. Both are also not very important in determining the approval rate. The regression does not suffer from autocorrelation or from instability in the estimates.

Quarterly Regression Equation: $\Delta y_t = \beta_o + \beta_1 u_t \exp(y_{t-1}) + \beta_2 \pi_t \exp(y_{t-1}) + \varepsilon_t$

corrected for heteroskedasticity – standard t-statistics in parentheses

(1) Kennedy 1961:1~1963:3 Obs. = 13 β_o: 0.103 (0.257) adj. R^2 = 0.48 β_1: 0.03 (0.482) D-W = 2.14 β_2: -.265 (-1.189) p-value of F = 0.12	(4) Ford 1974:3~1976:4 Obs. = 10 β_o: 0.616 (2.37) adj. R^2 = 0.74 β_1: -0.569 (-1.26) D-W = 1.33 β_2: -.044 (-1.95) p-value of F = .004	(7) Bush, Sr. 1989:1~1992:4 Obs. = 16 β_o 0.510 (2.00) adj. R^2 = 0.49 β_1: -0.047 (-1.14) D-W = 1.54 β_2: 0.025 (0.308) p-value of F =.01
(2) Johnson 1963:4~1968:4 Obs. = 21 β_o: 0.763 (3.3) adj. R^2 = 0.40 β_1: 0.454 (2.57) D-W = 0.97 β_2: -0.039 (-3.9) p-value F = 0.004	(5) Carter 1977:1~1980:4 Obs. = 16 β_o: 0.843 (4.79) adj. R^2 =0.70 β_1: 0.229 (3.95) D-W = 1.31 β_2: -0.327 (-4.66) p-value on F = 0.0	(8) Clinton 1993:1~2000:4 Obs. = 32 β_o: 0.562 (2.97) adj. R^2 = 0.19 β_1: -0.078 (-2.82) D-W = 2.18 β_2: -0.028 (-.606) p-value of F = 0.02
(3) Nixon 1969:1~1974:2 Obs. = 22 β_o: 0.476 (2.08) adj. R^2 = 0.60 β_1: 0.024 (0.95) D-W = 0.30 β_2: -0.14 (-5.15) p-value F = 0.001	(6) Reagan 1981:1~1988:4 Obs. = 32 β_o: 0.483 (3.22) adj. R^2 =0.19 β_1: -0.059 (-2.74) D-W = 1.08 β_2: 0.006 (0.30) p-value on F = .018	(9) Bush, Jr. 2001:1~2003:4 Obs. = 12 β_o: -0.068 (-.314) adj. R^2 = 0.365 β_1: -0.025 (-2.23) D-W = 2.10 β_2: 0.075 (1.02) p-value of F = 0.05

Table 5: Quarterly Sub-Regression Equations on Presidential Approval Ratings

Estimated Regression Equation
Monthly Data 1961:03 ~ 2003:12
$$\Delta y_t = \beta_o + \beta_1 u_t \exp(y_{t-1}) + \beta_2 \pi_t \exp(y_{t-1}) + \beta_3 D_t + \varepsilon_t$$
Least Squares Estimates – t-statistics in parentheses

β_o: 0.0778 (4.95) β_1: -0.0068 (-4.89) β_2: -0.0079 (-5.22) β_3: 0.6810 (15.01)	adj. R^2 = 0.337 D-W = 2.21 p-value F = 0.0001

Table 6: Overall Presidential Approval Ratings Regression

Note also that in Table 6 the dummy variable is also highly significant. Its magnitude shows that it is much more powerful in determining approval rates. This confirms again that in the short run, dramatic events can be useful in boosting presidential approval. We might remark here that this is precisely one of the major items of controversy in the recent Taiwan presidential elections. An assassination attempt one the eve of the election is thought to have significantly influenced the outcome of the election. Thus, a dramatic improvement in the economy is unlikely to compare with a dramatic event in raising popularity and possibly the outcome of an election. This might even be one way of estimating the amount of sympathy votes which a president could be expected to receive.

Table 7 presents the sub-period regressions for monthly data. Here we find a number of interesting results.

First, the adjusted R^2 statistics are extremely low, and at times negative. Once again we find that very short run movements in approval rates are extremely difficult to explain. Economic events have almost no effect at all on these ratings. Second, the signs on unemployment and inflation are all negative. This is at least an encouraging result since it confirms our intuition, despite the fact that the practical effects on approval ratings of inflation and unemployment are small. Third, we see the same type of pattern as with quarterly data. Namely, prior to Reagan, inflation appears to be more important in determining approval rates. After Carter, unemployment appears to be more important. This is something which is not clearly brought out in the literature on presidential approval. Finally, we should point out that statistical significance is extremely rare in these sub-regressions, despite the fact that both inflation and unemployment are statistically significant in the full period regression. It may be that judiciously choosing dummy variables for each sub-period might generate statistically significant estimates for inflation and unemployment. We have elected not to try this since it could easily be interpreted as data mining.

Monthly Regression Equation: $\Delta y_t = \beta_o + \beta_1 u_t \exp(y_{t-1}) + \beta_2 \pi_t \exp(y_{t-1}) + \varepsilon_t$

standard t-statistics in parentheses

(1) Kennedy 1961:03~1963:11 Obs. = 33	(4) Ford 1974:08~1977:01 Obs. = 30	(7) Bush, Sr. 1989:02~1993:01 Obs. = 48
β_o: 0.027 (0.285) adj. R^2 = - 0.48	β_o: 0.61 (3.02) adj. R^2 = 0.23	β_o 0.158 (2.07) adj. R^2 = 0.07
β_1: -0.002 (-0.358) D-W = 1.89	β_1: -0.066 (-2.15) D-W = 1.98	β_1: -0.012 (-1.94) D-W = 1.77
β_2: -0.004 (-0.547) p-value F = 0.77	β_2: -0.012 (-0.61) p-value F =0.027	β_2: -0.003 (-0.38) p-value F =0.07
(2) Johnson 1963:12~1969:01 Obs. = 62	(5) Carter 1977:02~1981:01 Obs. = 48	(8) Clinton 1993:02~2001:01 Obs. = 96
β_o: 0.038 (0.75) adj. R^2 = -0.017	β_o: 0.089 (1.29) adj. R^2 =0.063	β_o: 0.224 (3.47) adj. R^2 = 0.10
β_1: -0.003 (-0.59) D-W = 1.84	β_1: -0.005 (-0.53) D-W = 1.34	β_1: -0.032 (-3.25) D-W = 2.18
β_2: -0.007 (-0.79) p-value F = 0.61	β_2: -0.008 (-0.96) p-value F = 0.23	β_2: -0.004 (-0.84) p-value F = 0.003
(3) Nixon 1969:02~1974:07 Obs. =66	(6) Reagan 1981:02~1989:01 Obs. = 96	(9) Bush, Jr. 2001:02~2003:12 Obs. = 36
β_o: 0.065 (1.08) adj. R^2 = 0.029	β_o: 0.165 (2.92) adj. R^2 =0.07	β_o: 0.132 (1.27) adj. R^2 = 0.013
β_1: -0.005 (-0.5) D-W = 2.22	β_1: -0.018 (-2.93) D-W = 2.10	β_1: -0.008 (-1.48) D-W = 2.03
β_2: -0.009 (-1.74) p-value F = 0.15	β_2: -0.001 (-0.29) p-value F = 0.01	β_2: -0.006 (-0.82) p-value F = 0.31

Table 7: Monthly Sub-Regression Equations on Presidential Approval Ratings

VI. Summary and Conclusions:

This paper has looked at the economic determinants of US presidential approval ratings. It has used both monthly and quarterly data to investigate both the time series properties of the approval ratings and the most obvious economic variables that might affect such approval ratings. The following observations appear to be strongly supported by the data.

The most important determinant of approval ratings is the ratings themselves lagged one period. Indeed, regardless of whether one looks at monthly or quarterly observations, approval ratings are clearly governed by an AR(1) stochastic process. The fit for monthly data is extraordinary, with a first order correlation coefficient equal to 0.92 – almost exactly. For quarterly data, the first order correlation coefficient is roughly equal to 0.76, but is not as close a fit as that of monthly data. This means that *any* model which purports to investigate approval ratings, and contains lagged ratings as an explanatory variable, must subsequently face the fact that the residual variation is essentially white noise and is very difficult to explain.

Next, we find that the approval ratings are very slow to change. This is a direct

consequence of the near unit root spoken of in the preceding paragraph. It is difficult to know exactly why approval ratings exhibit such a stable AR(1) process, but one possible explanation is that the ratings are largely governed by party affiliation, which is also slow moving and subject to demographic influences. It would be worthwhile to investigate the distribution of party members (between say Republican and Democratic Parties) and its relation to the approval ratings, but that has not been attempted here.

Not only do we find that approval ratings are slow to change, but none of the economic variables considered here succeed in explaining more that a tiny fraction of the variation in the change in approval ratings. Unfortunately, the main result of this paper has been to find that economics does not seem to be all that important for the ratings, contrary to conventional wisdom. It may be that the economy does affect approval ratings of US presidents, but such influence is manifested in very subtle ways, perhaps in a long and slow lagged process. The standard tools of regression analysis are not capable of detecting any substantial direct and immediate effect. The data is very clear about this.

Among the economic variables, the rates of inflation and unemployment are found

to be statistically significant in affecting the change in approval ratings, when a particular innovative regression equation is employed. We have pioneered the use of a regression equation, which includes interaction terms on the right hand side, where the interaction is between exogenous variables and lagged, exponentiated dependent variables. The author is unaware of any other empirical paper in the field of economics which uses this device, although it may be that such a formulation has been used before. Certainly it is not discussed in popular texts on theoretical econometrics. Moreover, a theoretical justification for such a formulation has been given in the body of the paper. Basically, it is asserted that high rates of approval mean that some of those people approving of the president are in fact members of the opposing party. It follows that such supporters are easily turned against the president in the event of a deleterious change in the economy. Therefore, the effect of unemployment and inflation on approval ratings should be weighted by the lagged value of approval ratings (exponentiated to maintain parameter constancy and to emphasize the fall-away effect).

A Monte Carlo experiment was run to determine the rough changes in critical values of the standard t-test, in order to assess the significance of the estimated coefficients in the regression for the entire period. A total of 20,000 replications of the

equation were simulated on the computer, each regression having 100 observations. The t-statistics from the simulation were then used to form an empirical distribution, and standard 2.5% rejection regions were calculated. It was found that the critical values of the t statistic shifted left about 0.50, meaning that rejection of the null hypothesis of a zero effect required a value less than -2.46 or greater than 1.46. Clearly greater work needs to be done in assessing the statistical biases of the lagged interaction regression proposed here.

While it is true that both inflation and unemployment have statistically significant effects on approval ratings, such effects are nevertheless miniscule. This is something which needs further research. It is very counter-intuitive. What is found is that a *doubling* of inflation or unemployment will reduce approval ratings (within a period of time equal to a quarter) *less than 3 percentage points*. We have emphasized this by saying that both variables are statistically significant, but are practically irrelevant.

In the sub-period regressions, we find that the period 1960~1980 was a period when inflation was statistically significant and unemployment was statistically insignificant. This fits in well with what we know of US economic history.

Likewise, the period 1980~2003 was a period where unemployment was statistically significant and inflation was statistically insignificant. This again accords well with what we know of recent US economic history.

A dummy variable was constructed to catch two major factors – (i) accession to the presidency and (ii) wars, assassinations, and terrorist events. Both of these serve to raise the public's approval ratings for the president. It was seen that on average such events can be expected to raise the approval rating roughly 24 percentage points. This is a major variable in explaining outliers in the data.

It was also found that there is little difference using inflation and unemployment rates separately as explanatory variables, as opposed to combining them first into a "misery" index. An F-test failed to reject the hypothesis that the impacts of inflation and unemployment had separate but equal effects. However, the misery index does not do any better in explaining the variation than do the separate variables. An increase in the misery index does not substantially lower the president's approval rating.

Finally, we found that the regressions run over the whole period were quite stable.

We did not uncover any particular structural change in the regression. Both Chow tests and CUSUM tests tend to support the assertion that the regressions are stable. This is encouraging, since normally four decades of data would be hard to model consistently with a single equation. This speaks well for the formulation we have employed.

References:

Arrow, Kenneth 1951, Social Choice and Individual Values, New York: John Wiley.

Bolliger, Alfred 2004 PrintKey2000 freeware Version v5.10 full, at http://www.geocities.com/~gigaman

Cottrell, Allin 2001 Gretl (GNU Regression, Econometric Time Series Library) at http://gretl.sourceforge.net/

Estima 2004 RATS (Regression Analysis Time Series) at http://www.estima.com/

Fair, Ray C. 1982, "The Effect of Economic Events on Votes for President: 1980 Results", *Review of Economics and Statistics*, Vol. 10, May, pp. 322-325.

_____ 1988, "The Effect of Economic Events on Votes for President: 1984 Update" *Political Behavior*, Vol. 10, pp. 168-179.

_____ 1978, "The Effects of Economic Events on Votes for President", *Review of Economics and Statistics*, Vol. 60, May, pp. 159-173.

Frey, Bruno and Fredrich Schneider, 1978. "An empirical study of politico-economic interaction in the United States", *Review of Economics and Statistics*, Vol. 60, May, PP. 174-183.

Friedman, Milton, 1968,"The Role of Monetary Policy", *American Economic Review*, vol. 58, March, pp. 1-17.

Gordon, Robert J. 2003, *Macroeconomics*, 9th edition, New York,: Addison-Wesley.

Gronke, Paul. 1999, "Policies, Prototypes, and Presidential Approval." *Annual Meeting of the American Political Science Association*-- paper available at http://www.reed.edu/~gronkep/papers.html

_____ 2000, "FDR to Clinton, Mueller to ??: A State of the Discipline Review of Presidential Approval" *Annual Meetings of the American Political*

Science Association--paper available at http://www.reed.edu/~gronkep/papers.html

Hibbs, Douglas 1974, "Problems of statistical estimation and causal inference in time series regression models". In Herbert Costner, ed. *Sociological Methodology, 1973-1974*. San Francisco, Jessey-Bass: 252-308.

Kenski, Henry. 1980, "Economic Perception and Presidential Popularity: A Comment" *The Journal of Politics*, No. 1, February pp.68-75.

_____ 1977 "Inflation and Presidential Popularity", *The Public Opinion Quarterly*, Vol. 41, No1, Spring, pp. 86-90.

Keynes, John Maynard 1938 Excerpted from letters to R.F. Harrod. Chapter 16 "Economic model construction and econometrics" *The Philosophy of Economics: An Anthology*, ed. Daniel M. Hausman, 1994, Cambridge: Cambridge University Press pp. 286- 288.

_____. 2000, *A Tract on Monetary Reform*, Amherst: Prometheus Books – first published in 1923

Kramer, Gerald H. 1971, "Short Term Fluctuation in US Voting Behavior, 1896-1964", *American Political Science Review*, Vol 65. March pp. 131-143.

Lanoue, David 1987, "Economic Prosperity and Presidential Popularity: Sorting Out the Effects" *The Western Political Quarterly*, June, pp.237-245.

Lucas Jr., Robert, 1973, "Some International Evidence on Output-Inflation tradeoffs", *American Economic Review,* vol. 63. June, pp.326-334.

Marshall, Alfred. 1923, *Money, Credit, and Commerce*. London, MacMillan

McCloskey, Donald 1983, "The Rhetoric of Economics", *Journal of Economic Literature,* June, pp. 481-517.

Monroe, Kristen, 1978 "Economic Influences on Presidential Popularity", *The Public Opinion Quarterly*, Autumn, pp. 360-369.

Mueller, John E. 1973, *War, Presidents, and Public Opinion.* New York: Wiley

_____. 1970, “Presidential popularity from Truman to Johnson”, *American Political Science Review*, Vol. 64, March pp. 18-34.

Nadeau, Richard, Richard Niemi, David Fan, and Timothy Amato, 1999, “Elite Economic Forecasts, Economic News, Mass Economic Judgments, and Presidential Approval”, *Journal of Politics*, Vol. 61, N0.1, February, pp.109-135.

Nordhaus, William. 1975, “The Political Business Cycle”, *Review of Economic Studies*, Vol. 42, April, pp. 169-190.

Norpath, Helmut and Thom Yantek, 1983, “Macroeconomic Conditions and Fluctuations of Presidential Popularity: The Question of Lagged Effects”, *American Journal of Political Science*, Vol. 27, No. 4 Nov 1983, pp. 785-807.

Ramanathan, Ramu 2001 *Introductory Econometrics with Applications*, 5th edition, New York: Harcourt College Publishers.

Rogoff, Kenneth and Anne Siebert, 1988 ”Elections and Macroeconomic Policy Cycles” *Review of Economic Studies*, Vol 55, Jan. pp. 1-16.

Sargent, Thomas and Neil Wallace, “’Rational Expectations’, the Optimal Monetary Instrument, and the Optimal Supply Rule”, *Journal of Political Economy*, vol. 83, April, pp.241-254.

Stigler, George 1973, “General Economic Conditions and National Elections”, *American Economic Review*, Vol. 63, May, PP. 160-167.

Stimson, James A. 1976 “Public Support for American Presidents: A Cyclical Model” *The Public Opinion Quarterly*, Spring, pp. 1-21.